Chapter Three

Alternatives

Final Environmental Impact Statement

Vancouver Rail Project

The Washington State Department of Transportation (WSDOT) has identified the **Vancouver Rail Project** as the first major improvement needed to begin upgrading current Amtrak *Cascades* service along the Pacific Northwest Rail Corridor (PNWRC). The **Vancouver Rail Project** is located in the City of Vancouver (in Clark County) and extends from approximately rail milepost 132.5 to 136.5 on The Burlington Northern and Santa Fe Railway Company's (BNSF) Seattle to Portland main line and to rail milepost 10.0 on the BNSF's Vancouver, WA to Spokane main line. Most of the project is located within the railroad's right-of-way. The project is approximately four miles in length. **Exhibit 3-1** on the following page shows the general project area and termini.

What are the project termini and why are they logical?

In order to understand the project termini and why this specific location was chosen, an overall understanding of general railroad design and operations is necessary.

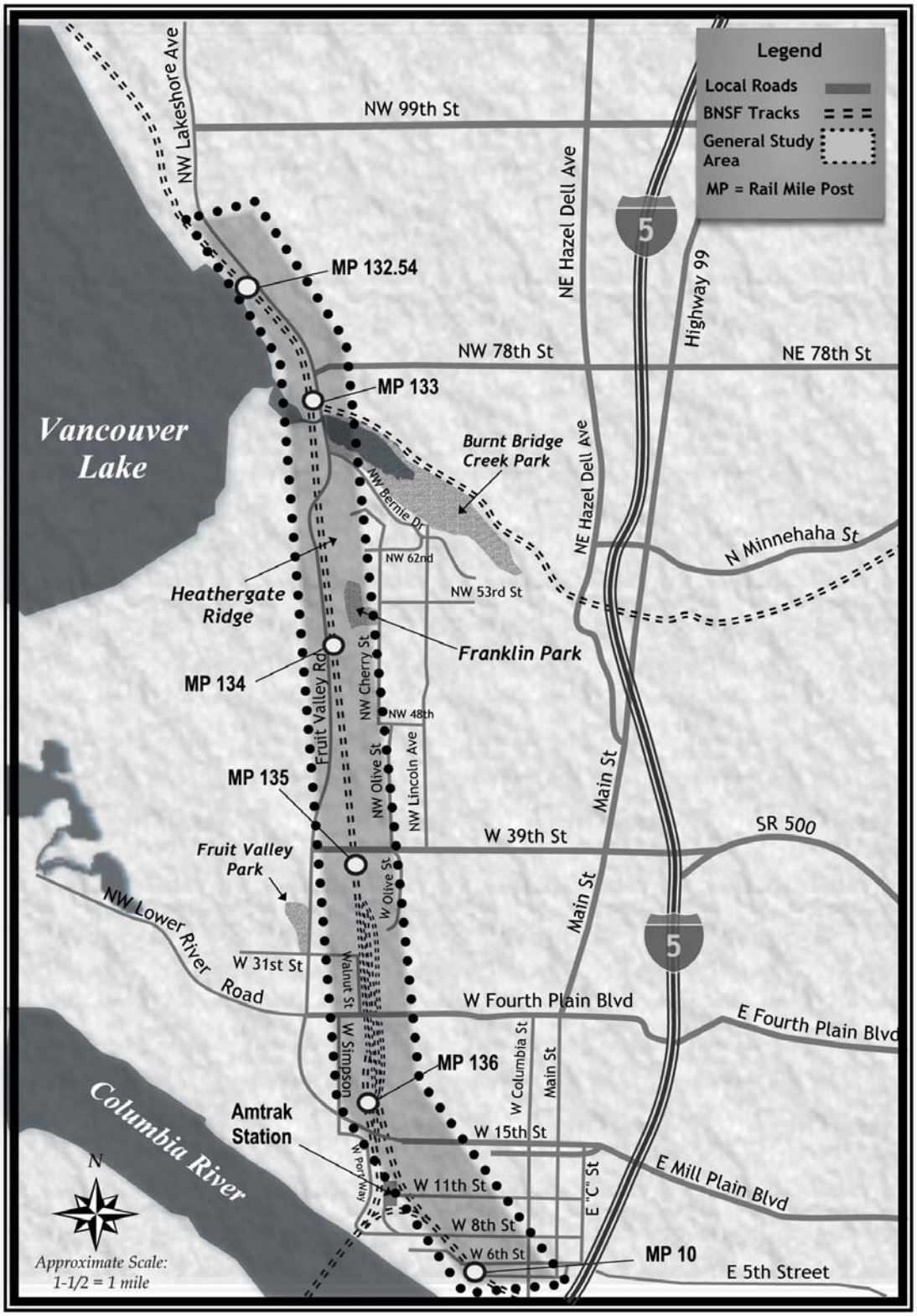
A railroad is a fixed-route transportation system. Trains, unlike motor vehicles, must follow a track. Trains can only change "lanes", turn or enter/leave the route when a track has been specifically constructed for that purpose. Designing for railroads involves figuring out exactly where trains will need to enter and leave the route, change tracks and turn onto another route. As such, a number of rail characteristics must be taken into consideration. **Exhibit 3-2** highlights some of these general railroad elements.

The **Vancouver Rail Project** – and its northern and southern termini – was designed by figuring out how specific tracks at specific locations could solve the problems in the Vancouver area. As part of a rail operational analysis, a simulation model of current and future conditions was performed. Analysis of the modeling results helped to identify the location and the type of improvements necessary to relieve the chokepoints in Vancouver.

How does a railroad simulation model work?

Railroad companies perform careful operational studies to determine the need, type, and location for additional tracks. Public agencies sponsoring passenger rail service also study the need for additional tracks carefully. Often the public agency — and the railroad owning the rail line — will study track needs repeatedly, removing and adding tracks, until both parties agree on the amount of track and other improvements absolutely necessary to perform the desired function. WSDOT, working with BNSF, performed many such studies. These operational studies use a tool called simulations or simulation models.

Simulations follow the location of current and future trains minute by minute along a specific segment of a rail line. Depending on the level of analysis, simulations are created manually on paper, created in a computer spreadsheet, or created in a



General Project Area
Exhibit 3-1

Railroad Characteristics and Their Relevance

Exhibit 3-2

CHARACTERISTIC	WHY IS IT IMPORTANT?
Track Structure	Track structure has three elements: rails, ties and ballast. **Rails** are made of steel. Even though the steel is very hard, the rail wears out, just as highway pavement wears out. The **ties**, typically made of wood or concrete, support the rails. **Ballast** is crushed rock used to support the ties and keep the track in correct alignment. The condition of each of these elements dictates the weight and type of equipment that can be used on the line, as well as the speeds allowed on the line.
Number of Tracks	The number of tracks affects the capacity of the line. Two tracks (also called **double track**) have more capacity (the number of trains that can move through the area) than one track (**single track**). **Sidings** also increase the capacity of a rail line. Sidings located along the line allow faster trains to overtake slower trains without affecting train traffic on the other track. The capacity of the rail line and the reliability of operation are affected by the time required to move between sidings.
Grade (the steepness of the tracks at various locations)	The steepness of the track dictates the types of trains that can use the rail line. Typical grades for freight trains do not exceed 2%, while grades for passenger trains can be as high as 4%.
Curves (often presented in degrees)	The tightness of the **curve** dictates the speed that a train can travel. The higher the degree, the tighter the curve, the slower the speed. Amtrak *Cascades* trains can travel faster through tight curves (than most trains) because they use tilt technology.
Speed Regulations	Train **speed limits** are generally regulated by the Federal Railroad Administration (FRA). The Code of Federal Regulations (49 CFR 213, Track Safety Standards) establishes classes of track with associated speed limits and detailed physical requirements for tracks in a given class. Speeds may also be restricted by the Washington Utilities and Transportation Commission (WUTC).
Traffic (Number of Trains)	The **number and type of trains** along a rail line relate directly to capacity. The more trains that are put on a track, the more the need for additional track signals and controls. Without these signals and controls, the speed and capacity of the rail line would diminish as traffic increases.
Width	The rails of a railroad track are spaced 56.5 inches apart. To allow sufficient clearance between vehicles on adjacent tracks, the tracks are spaced at least 15 feet apart. Recent FRA Safety Regulations dictate that if rail traffic is to continue while maintenance is performed on an adjacent track, the tracks must be placed at least 25 feet apart from the center of each track. This is often referred to as 25-foot centerline.
Length	Each track that is not a through-route must be long enough to serve the intended purpose. Just as a parking space for a tractor-trailer must be of sufficient length for the vehicle, a railroad track must be long enough to hold even the longest train. Depending on the type of train traffic handled, the length of a typical passenger train is between 500 feet and 1,700 feet. The length of a typical freight train can be between 7,000 feet and 10,000 feet (over a mile—5,280 feet—in length).
Signals and Traffic Control	Signals help extend the engineer's sight distance and therefore allow greater speeds. Traffic control determines which trains can use which tracks – it increases safety and movement of trains.

sophisticated computer program.[1] The simulation procedure in each case is similar, and includes:

- Representation of the existing track configuration.
- The minute-by-minute location of every train entering and leaving the area (current trains as well as anticipated future trains).
- Determination of the conflicts between trains as they use the tracks and associated facilities.
- Determination of what conflicts could be solved by changing the time certain trains operate, as well as determining if the time can be changed for these trains (trains have various schedule and maintenance requirements that need to be met).
- Determination of what additional track and facilities are required to accommodate trains that cannot operate at different times. When considering additional track, the possible environmental and economic consequences are also considered.

This procedure was repeated over the course of many years to ensure that the **Vancouver Rail Project** alternatives met the project's purpose and need while creating minimal impacts to the surrounding environment and community.

What were the results of these analyses?

Rail operations analyses and simulations identified project improvements necessary to meet the **Vancouver Rail Project's** purpose and need. Because the railway is a fixed-route system, and each track and its location serves a very specific purpose, few site options were available for improvement locations. Through the modeling and analysis effort, specific improvements in specific locations were identified as being critical to solving the Vancouver area chokepoints. Improvements included extension of the existing Northern Pacific (NP) siding located west of the main line in the Vancouver yard area, and improvements to associated facilities.

In addition, the construction of bypass tracks around the Vancouver rail yard was identified as a crucial element to solving the congestion problem in this area. However, analysis of the simulation results indicated flexibility for the location of the rail bypass. As such, a number of alternative locations in the Vancouver area that could accommodate the needed bypass (and associated rail facilities) were developed.

Roadway traffic and safety analyses also indicated that elimination of the at-grade crossing at West 39th Street[2] would be an essential element for safety improvements – both to rail passengers and to motorists and pedestrians. Based on these findings,

---

[1] *For the **Vancouver Rail Project**, the project team used Berkeley Simulation Software's Dispatch Model (DPM) and Berkeley's Rail Traffic Controller (RTC) model.*

[2] *In early 2000, a traffic analysis was performed to look at the potential roadway impacts that might occur if West 39th Street was closed or reconfigured. The discussion on* Alternatives Considered *later in this chapter presents the findings from this traffic analysis.*

a number of alternatives for the West 39th Street crossing were developed for consideration in this Environmental Impact Statement.

What alternatives were considered for this EIS?

Community Resource Team (CRT) members evaluating alternatives

Early in the study process, the project team identified four potential alternatives as well as the No Action Alternative for consideration in this EIS. As part of the early development process, the project team met with City of Vancouver Transportation and Planning staff to discuss the scope of the traffic analysis (prepared for this EIS), as well as potential alternatives for West 39th Street. At the suggestion of City of Vancouver representatives, a community team was established for this project. For an eight month period beginning in January 2000, a Vancouver Community Resource Team (CRT) worked with the project team to develop additional alternatives. The CRT consisted of representatives from the City of Vancouver Planning Department, Fire Department and Police Department; the Regional Transportation Council; the Vancouver School District, the Vancouver Housing Authority, neighborhood groups; the Port of Vancouver; and other regional and local agencies/groups[3]. Working with the project team, the CRT helped establish a fatal flaw evaluation methodology to identify alternatives for study in this environmental document. Using the project's purpose and need as a foundation for fatal flaw review, the CRT and project team evaluated a number of preliminary alternatives. For each alternative, the following questions were asked:

- Is the alternative safe for the local community and the region?
- Does the alternative effectively solve the rail congestion problems in Vancouver?
- Is the alternative feasible from an engineering standpoint?
- Is the alternative feasible from a cost perspective?
- Does the alternative avoid significant impacts to the natural environment and the community?

[3] *A complete listing of CRT members can be found in the section entitled "Agency and Public Coordination".*

If "no" was answered for any of these questions, it was determined that the alternative did not meet the project's purpose and need, and was thus eliminated from further review.

Exhibit 3-3 presents the preliminary alternatives that were evaluated by the project team and the CRT. **Exhibits 3-4** through **3-9** illustrate the general locations of these preliminary alternatives.

Which of these alternatives were considered but rejected?

The project team and the Community Resource Team (CRT) identified eight alternatives for elimination. Alternatives were eliminated through a series of roundtable discussions, member voting, and fatal flaw evaluation (purpose and need questions). The following discusses these alternatives and their elimination.

Alternative E (Easterly Bypass with West 39th Street Closed, Improvements to Surrounding Arterials)

The project team and the Community Resource Team chose to eliminate this alternative from further review because it is the same as Alternative I, Option 2, with proposed mitigation. Mitigation options are suggested for Alternative I, Option 2 as part of this analysis.

Alternative F (Easterly Bypass with No Changes to West 39th Street)

This alternative was eliminated because it does not meet the project's purpose and need to increase safety in the Vancouver yard area. Construction of the bypass and new sidings would increase the number of tracks crossing West 39th Street from seven to nine; however, West 39th Street would remain open. An additional set of warning gates would be required on the western side of the at-grade crossing, thus potentially resulting in automobiles being "trapped" between the tracks as the two sets of warning gates open and close. In addition, because of the number of tracks and different types of activities at this location, West 39th Street would likely be closed for extensive periods of time due to future freight rail growth. As a result, based on historic scenarios, many individuals would choose to drive around the warning gates. This would become increasingly dangerous.

A recent analysis[4] performed by the Washington State Department of Transportation recorded this type of behavior. For a period of sixty days, three railroad-highway crossings were monitored by video camera. On average, cars were seen waiting at the warning gates for eleven to twenty seconds before driving around the gates. The video clearly showed motorists becoming impatient and not another analysis,[5] monitoring at West 39th Street revealed that "vehicles drove around the gates…so they would not be delayed." Although a quantitative analysis was not performed, it was confirmed through discussions with CRT members that motorists often drive around the gates at West 39th Street.

---

[4] *Washington State Department of Transportation Rail Office, Northwest Grade Crossing Safety Study, The Transpo Group, March 2000.*

[5] *David Evans and Associates, Inc., Revised Draft Report West 39th Street Rail Crossing Transportation Analysis, April 2000.*

Preliminary Alternatives Considered

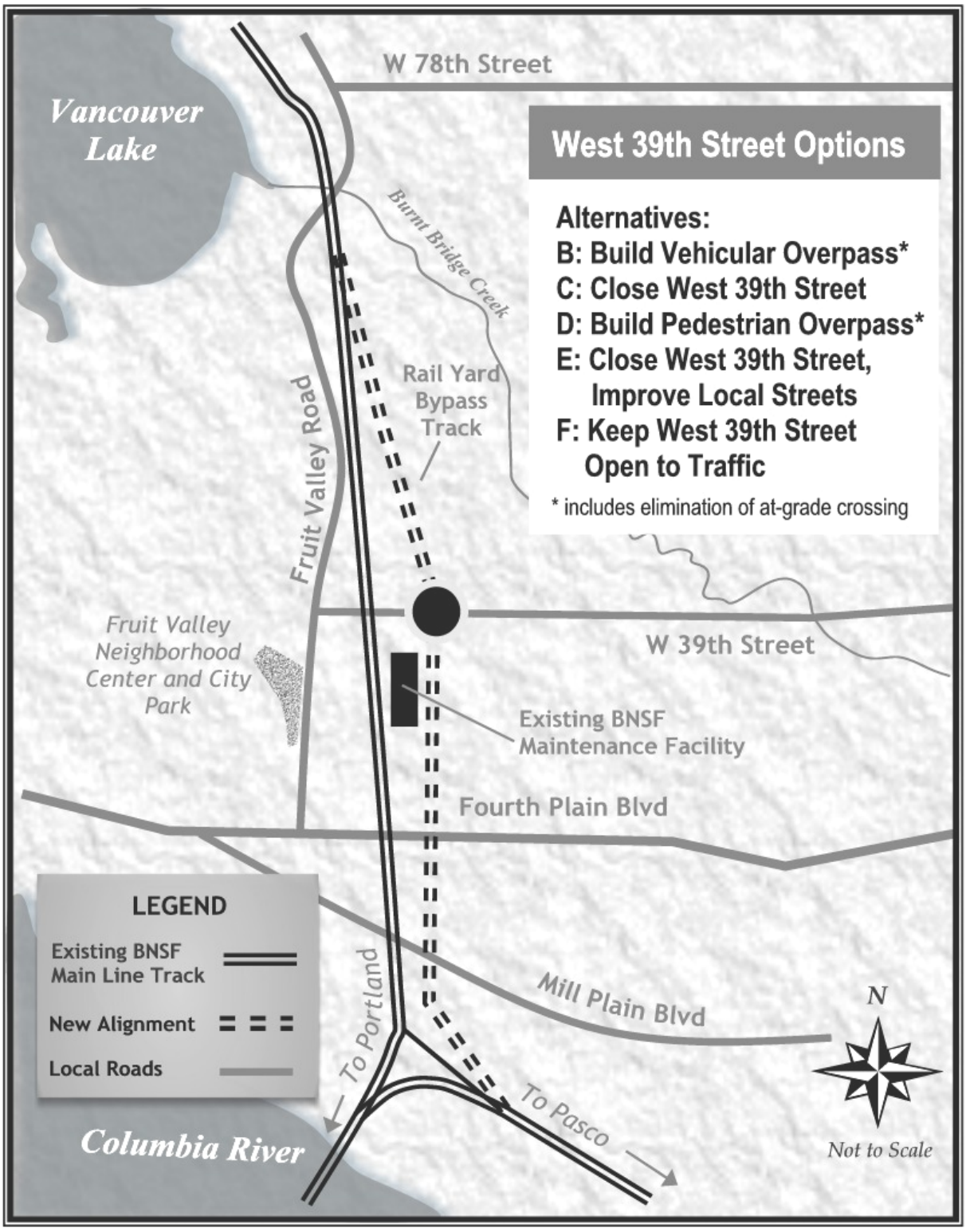
Exhibit 3-3

ALTERNATIVE	DESCRIPTION
Alternative A: No Action	No project would be implemented. Passenger trains would continue to be delayed. Safety issues at West 39th Street would continue. General freight track maintenance would continue.
Alternatives B: Easterly Bypass with Vehicular Overpass	This alternative consists of the construction of a double track rail yard bypass east of the existing BNSF tracks. At its widest point (where it crosses West 39th Street), the bypass would be approximately 675 feet from the existing easternmost track. In addition, several yard tracks in the north end of the existing yard would be lengthened. A vehicular overpass with sidewalks for pedestrians and bicyclists would be provided at West 39th Street. The at-grade crossing would be closed. Preliminary conceptual costs for this bypass option would be approximately $55 million.
Alternative C: Easterly Bypass with West 39th Street Closed	Proposed bypass and rail facilities would be the same as Alternative B. The at-grade crossing at West 39th Street would be closed. No access would be provided at this location. Preliminary conceptual costs for this bypass option would be approximately $47 million.
Alternative D: Easterly Bypass with Pedestrian Overpass	Proposed bypass and rail facilities would be the same as Alternative B. A pedestrian and bicycle overpass would be provided at West 39th Street. The at-grade crossing would be closed. Preliminary conceptual costs for this bypass option would be approximately $49 million.
Alternative E: Easterly Bypass with West 39th Street Closed, Improvements to Surrounding Arterials	Proposed bypass and rail facilities would be the same as Alternative B. The at-grade crossing at West 39th Street would be closed. In lieu of reconfiguring the highway-rail crossing at this location, improvements would be made to local arterials. In particular, various improvements would be made to Fruit Valley Road, which is located south of West 39th Street. The at-grade crossing would be closed. Preliminary conceptual costs for this bypass option would be approximately $49 million.
Alternative F: Easterly Bypass with No Changes to West 39th Street	Proposed bypass and rail facilities would be the same as Alternative B. The at-grade crossing at West 39th Street would remain open. Preliminary conceptual costs for this bypass option would be approximately $50 million.
Alternative G: Move rail yard to the west side of Vancouver Lake	This alternative would eliminate the existing Vancouver rail yard from its current location and move it west of Vancouver Lake. As such, the new alignment would leave the current main line in the vicinity of Felida, (rail milepost 130.7). It would cross the Lake River and enter the Shillapoo-Vancouver Wildlife Refuge. The alignment would likely run parallel to SR 501 (a.k.a. River Road) until it reaches just west of the Port of Vancouver. From there the alignment would travel southeast and connect to the main line near the Vancouver Amtrak passenger rail station. Initial conceptual cost estimates for this alternative were over $200 million.

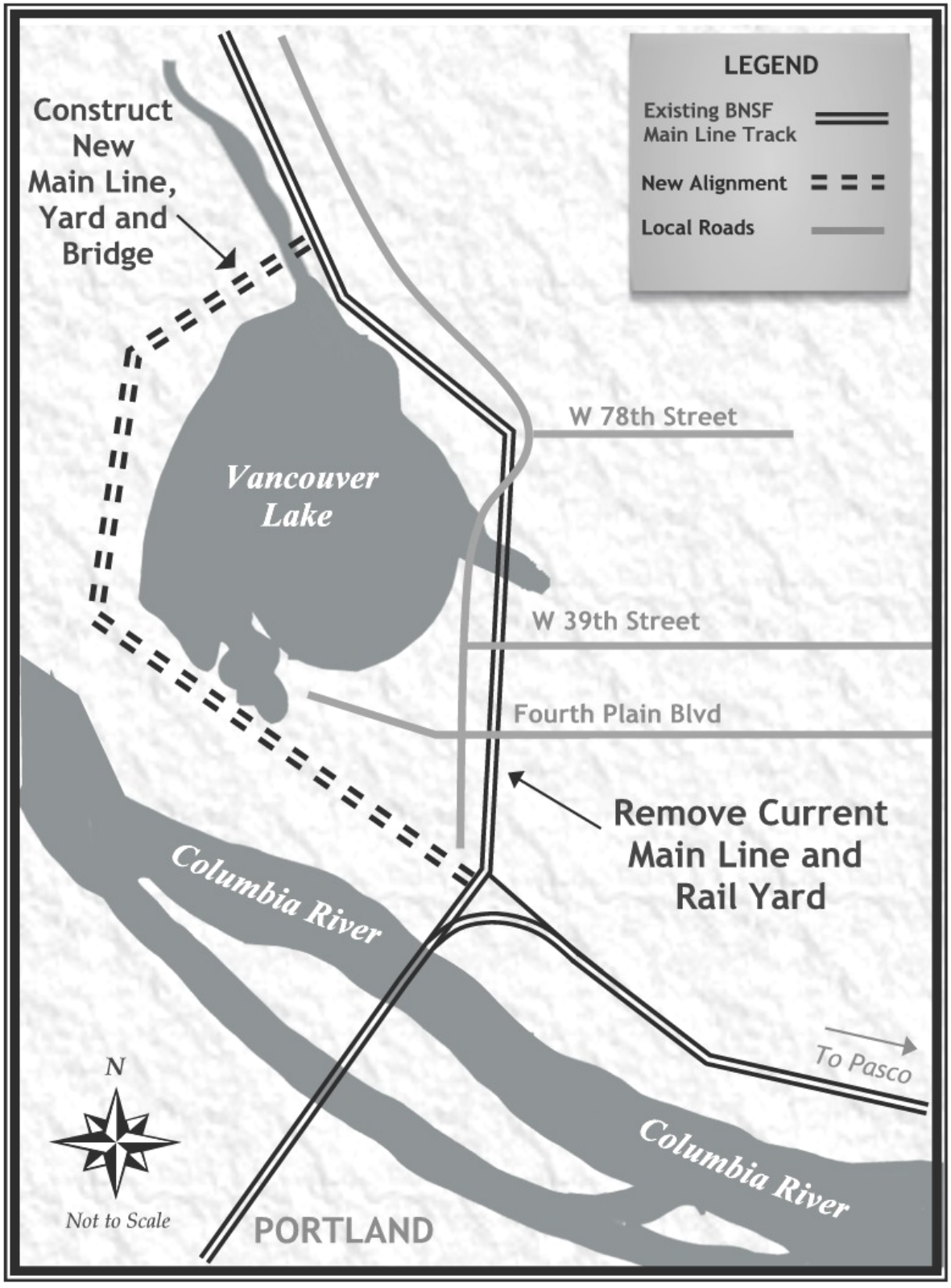
Preliminary Alternatives Considered

Exhibit 3-3 Continued

ALTERNATIVE	DESCRIPTION
Alternative H: Reroute freight traffic	This alternative would reroute rail traffic to/from Seattle through other parts of southwest Washington. Suggestions included utilizing the Lewis and Clark Railroad and its 33 miles of existing track leading from Fruit Valley to Yacolt. From Yacolt, a new alignment would have to be constructed from Yacolt, south – to connect with the east-west main line. A new rail yard would also have to be constructed if traffic were to be rerouted to this new rail line. Initial conceptual cost estimates for this alternative were over $400 million.
Alternative I: Westerly Bypass with West 39th Street Closed	This alternative consists of the construction of a double track rail yard bypass east of the existing BNSF tracks. At its widest point (where it crosses West 39th Street), the bypass would be approximately 450 feet from the existing eastern most track. In addition, several yard tracks in the north end of the existing yard would be lengthened. The at-grade crossing at West 39th Street would be closed. No access would be provided at this location. Initial conceptual cost estimates for this alternative were approximately $50 million.
Alternative J: Westerly Bypass with Vehicular Overpass	Proposed rail facilities would be the same as Alternative I. A vehicular overpass with sidewalks for pedestrians and bicyclists would be provided at West 39th Street. The at-grade crossing would be closed. Initial conceptual cost estimates for this alternative were approximately $57 million.
Alternative K: Westerly Bypass with Pedestrian Overpass	Proposed rail facilities would be the same as Alternative I. A pedestrian and bicycle overpass would be provided at West 39th Street. The at-grade crossing would be closed. Initial conceptual cost estimates for this alternative were approximately $52 million.
Alternative L: Westerly Bypass with Transit/Emergency Vehicle Overpass	Proposed rail facilities would be the same as Alternative I. A vehicular overpass, dedicated to emergency and transit vehicle use, with sidewalks for pedestrians and bicyclists would be provided at West 39th Street. The at-grade crossing would be closed. Initial conceptual cost estimates for this alternative were approximately $57 million.
Central Rail Yard Bypass	This alternative bypass would travel through the center of the existing rail yard facility. It would require the relocation of the existing railroad maintenance facilities, including major buildings and the locomotive fueling station, to the east side of the yard. Preliminary conceptual costs for this alternative would be approximately $65 million.
Western Rail Yard Bypass	This alternative bypass would require the construction of a new rail line along the western border of the existing rail yard facility. Preliminary conceptual costs for this alternative would be approximately $45 million
Burnt Bridge Creek Alignment	This alignment would leave the existing main line near Burnt Bridge Creek. It would travel east, parallel to Burnt Bridge Creek. Somewhere in the area of McLaughlin Heights, the alignment would leave Burnt Bridge Creek and rejoin the east-west main line in the vicinity of I-205 and the Columbia River. Preliminary conceptual costs for this alternative would be well in excess of $300 million.



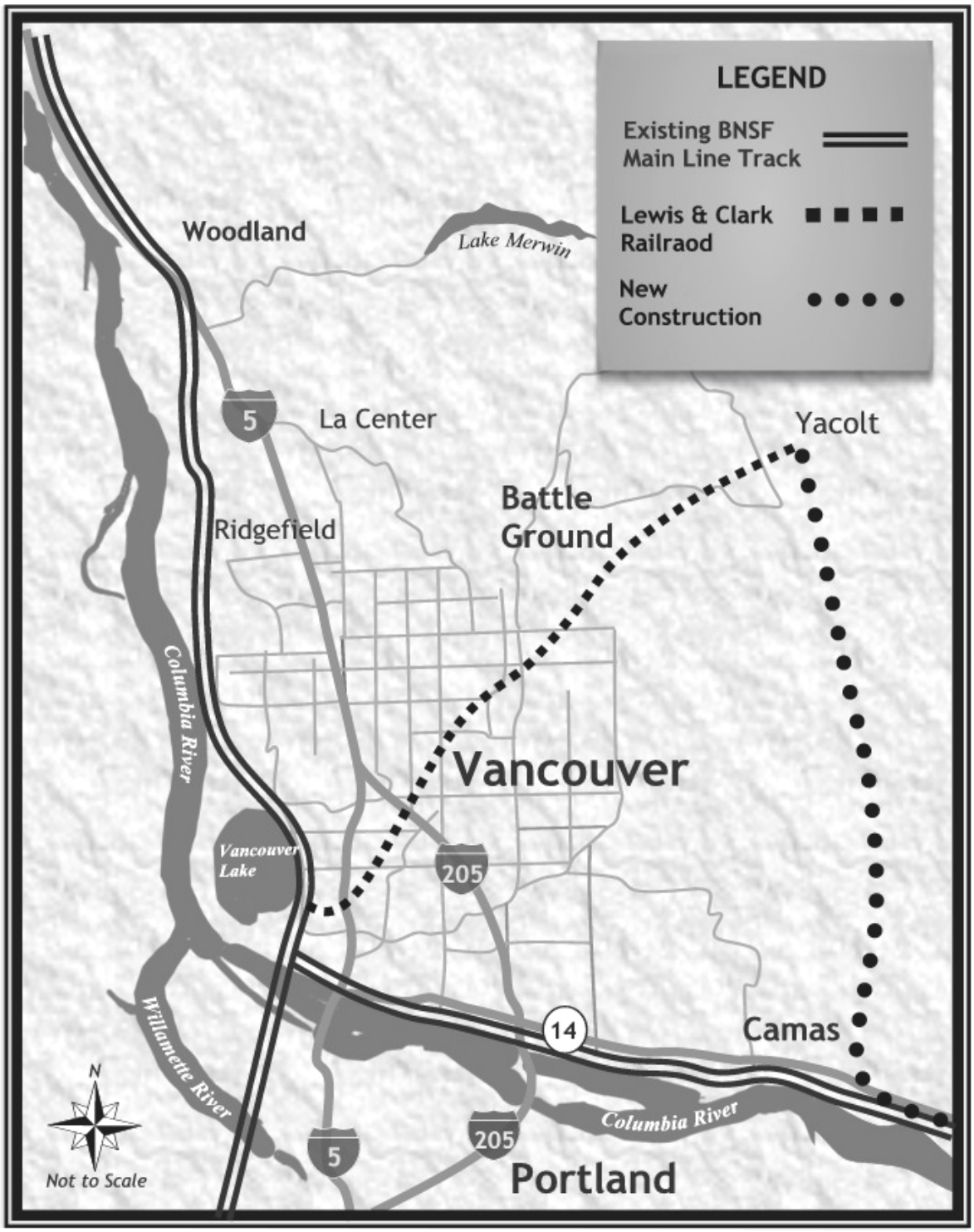
Preliminary Alternatives Considered
Exhibit 3-4
Alternatives B through F: Easterly Bypass



Preliminary Alternatives Considered

Exhibit 3-5

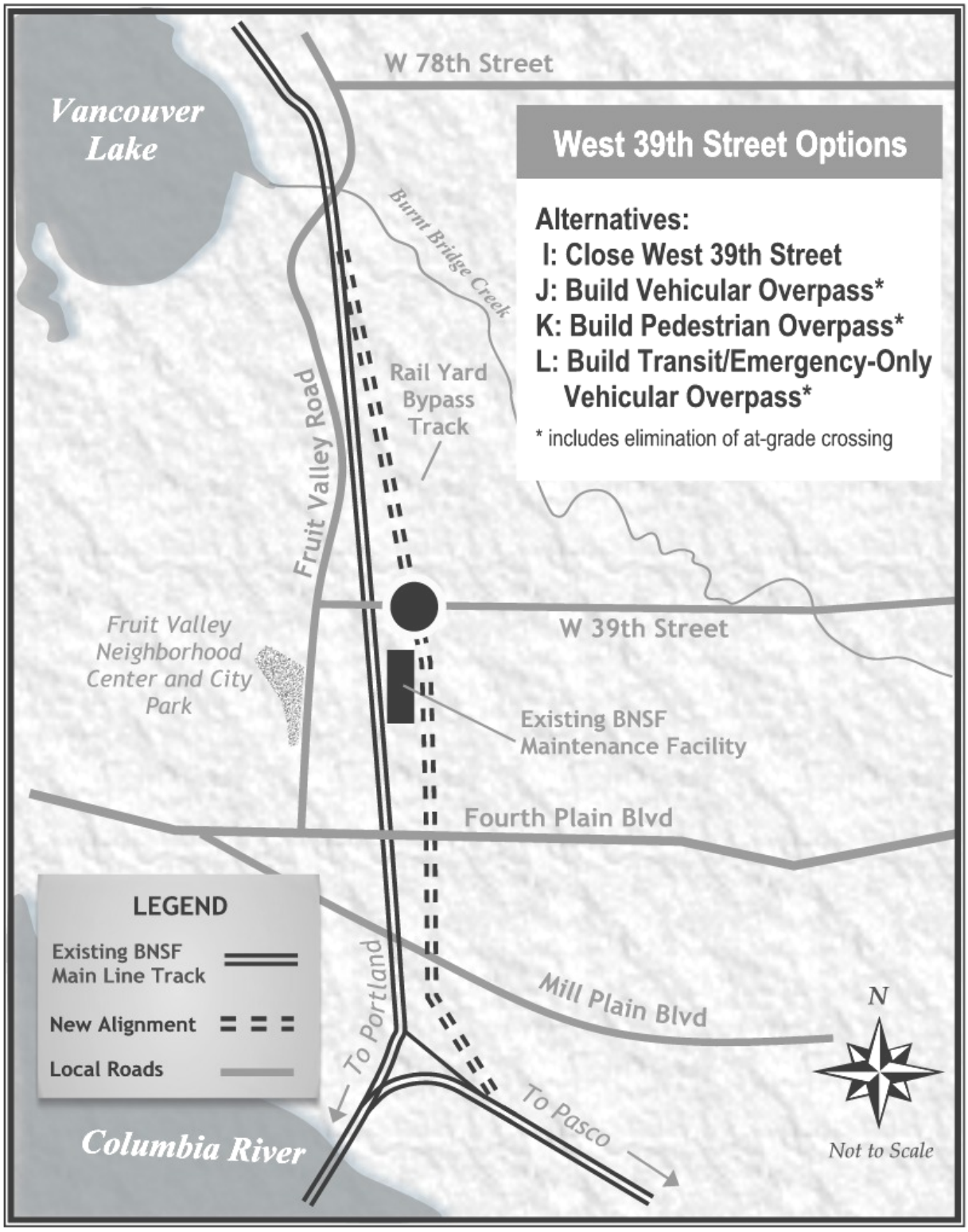
Alternative G: Move Vancouver Rail Yard to West Side of Vancouver Lake



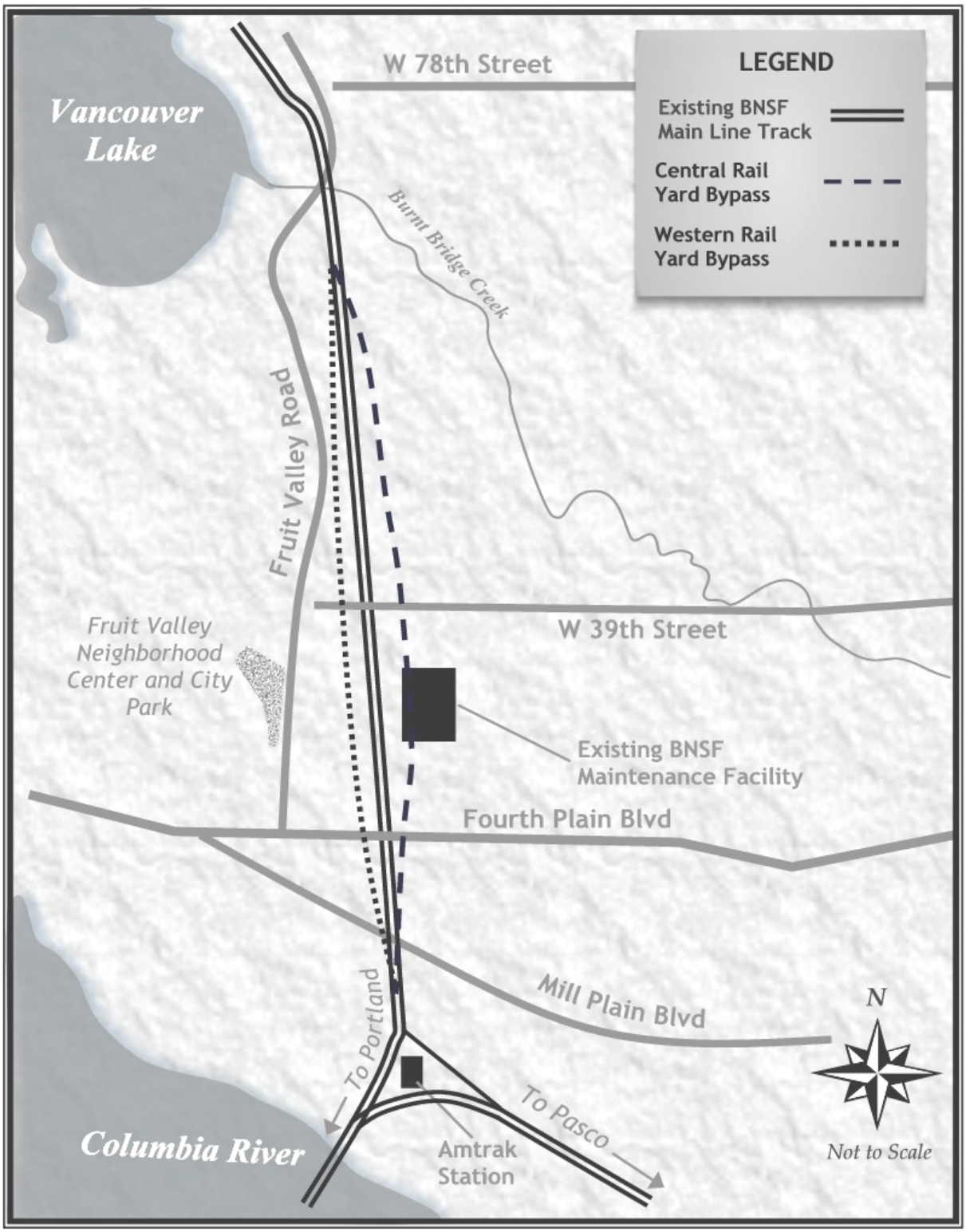
Preliminary Alternatives Considered

Exhibit 3-6

Alternative H: Re-route Freight Traffic



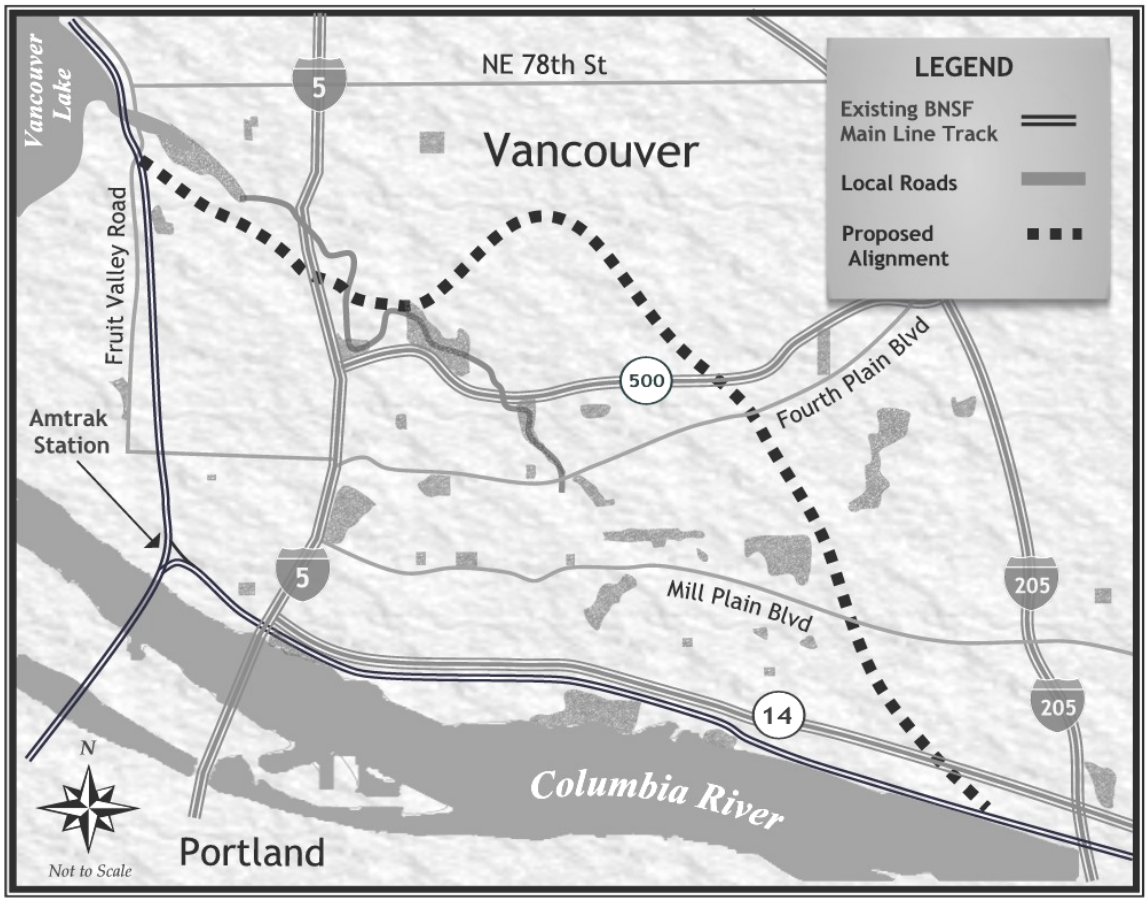
Preliminary Alternatives Considered
Exhibit 3-7
Alternatives I through L: Westerly Bypass



Preliminary Alternatives Considered

Exhibit 3-8

General Location Central Rail Yard Bypass and Western Rail Yard Bypass Alternatives



Preliminary Alternatives Considered
Exhibit 3-9
Burnt Bridge Creek Alignment

Alternative G (Move Rail Yard to the West Side of Vancouver Lake)

This alternative was eliminated from further review for the following reasons:

- Tremendous cost to rebuild the rail line (over $200 million);
- The BNSF would not consider such an option since it would add increased travel time to their shipments; and
- There would be extensive impacts to wetlands, parkland and wildlife (over 400 acres of impacts).

The alignment would travel northwest around Vancouver Lake, crossing Lake River (Vancouver Lake's outlet). Both water bodies provide habitat for endangered species. In addition, the entire area around Vancouver Lake is considered wetlands or wetland buffer, and is within the floodplain. Parkland impacts would also be extensive, since the alignment would travel through the Shillapoo-Vancouver Wildlife Refuge and Vancouver Lake Park.

Alternative H (Re-route Freight Traffic)

The railroad is a private corporation with its own business and operations plans, as such, it is not within the State's domain to reroute freight traffic. In addition, the Lewis and Clark Railroad would need considerable upgrading that would result in impacts to wetlands and the natural environment. A connection at Yacolt to the east-west main line would require substantial right-of-way acquisition through existing communities and natural areas. Over 1,800 acres would be required to construct this route. Such costs (over $400 million) would be extremely prohibitive.

Alternative L (Westerly Bypass with Transit/Emergency-Only Vehicular Overpass)

This alternative was eliminated from further study based on interviews with local transit (C-Tran) personnel and emergency service representatives. The C-Tran 25-Year Plan does not include any plans for service along West 39th Street in this area. Interviews with C-Tran representatives confirmed that service is not planned for West 39th Street since it does not link major activity centers. Other routes in the area serve the community via a more direct and utilized route. In addition, although emergency services staff indicated they would use an exclusive right-of-way for emergency access, other alternatives considered in this evaluation provide equivalent access. The cost of a facility ($57 million) for such minimal use can not be justified, given the other alternatives (of equal or less cost) that are being considered as part of this analysis. As such, the alternative was eliminated.

Central Rail Yard Bypass

This alternative does not meet the purpose and need because the switching activities at the south end of the yard would still be in conflict with eastbound/westbound train movements, thus blocking the main line.

In addition, this alternative bypass would require the relocation of the existing railroad maintenance facilities to the east side of the yard. Facilities would include the car repair shop, locomotive fueling station, and other maintenance facilities. This alternative would have increased impacts to the homes just east of the rail yard, due to the increased noise from switching, car repair, and locomotive maintenance, since the rail maintenance operations would be located much closer to homes. The cost ($65 million) would also be higher as a result of the relocation of the existing maintenance facilities.

Burnt Bridge Creek Alignment

This alternative was eliminated due to its cost (over $300 million) and significant environmental and community impacts. The alternative would impact wetlands, Burnt Bridge Creek, and the surrounding communities. Extensive relocation and disruption could occur to homes and businesses in the neighborhoods of Salmon Creek, Walnut Grove, Minnehaha, McLoughlin Heights, and Russell Landing. Salmon Creek Greenway Park would be impacted.

In addition, this alternative would impact wetlands and wetland buffers along Burnt Bridge Creek and Salmon Creek. Both water bodies provide habitat for endangered

species. Over 2,100 acres along this alignment would be impacted. In addition, numerous structures would be required to go over (or under) I-5, Highway 99, and numerous local arterials and roadways. These structures would be extremely expensive and would disrupt communities from both a physical and visual perspective.

Western Rail Yard Bypass

Review of this alternative indicated that rail operations would not be improved, and could possibly be worsened. Trains moving between the north and east would continue to conflict with trains moving between the north and south. Trains moving between the north and east would also continue to interfere with car switching. In addition, it was determined that this western bypass could have increased impacts on the Fruit Valley neighborhood. Property acquisition to accommodate the bypass on the west side of the yard would result in business relocations. There would be increased noise in the Fruit Valley neighborhood because the bypass tracks would be closer to the community. Safety would not be improved.

What alternatives were selected for further study?

The Community Resource Team (CRT) recommended six build alternatives for further study in this Environmental Impact Statement (EIS). All of the alternatives (except the No Action Alternative) include construction of a rail bypass and associated improvements as well as elimination of the West 39th Street at-grade crossing. The following discussion presents each of these build alternatives.[6] This discussion follows the alignment beginning at the northern end of the project. **Appendix A** presents the conceptual design for these build alternatives. **Exhibit 3-11** illustrates the locational difference between the two bypass alternatives.

Old Northern Pacific (NP) siding right-of-way located at the northwest end of the project

Alternative B: Easterly Bypass Alignment

This build alternative consists of the construction of a double track rail yard bypass east of the existing BNSF tracks. In addition, several siding tracks in the north end of the existing yard would be lengthened.

[6] *In an effort to avoid redundancy in this environmental process, the study team grouped and renamed the six remaining build alternatives.* ***Exhibit 3-10*** *presents these alternatives, their original names (developed as part of the CRT process), and their new names.*

The alignment begins at approximately rail milepost 132.5 near Burnt Bridge Creek. The Northern Pacific (NP) siding, located west of the double track main line will be restored in this area. Along the entire alignment, to approximately rail milepost 135, the NP siding would either be rehabilitated or new track would be built. In addition, various turnouts would be constructed, while some existing turnouts would be removed. Retaining walls and fill would also be incorporated throughout this alignment. **Exhibit 3-12** presents a summary of retaining wall locations.

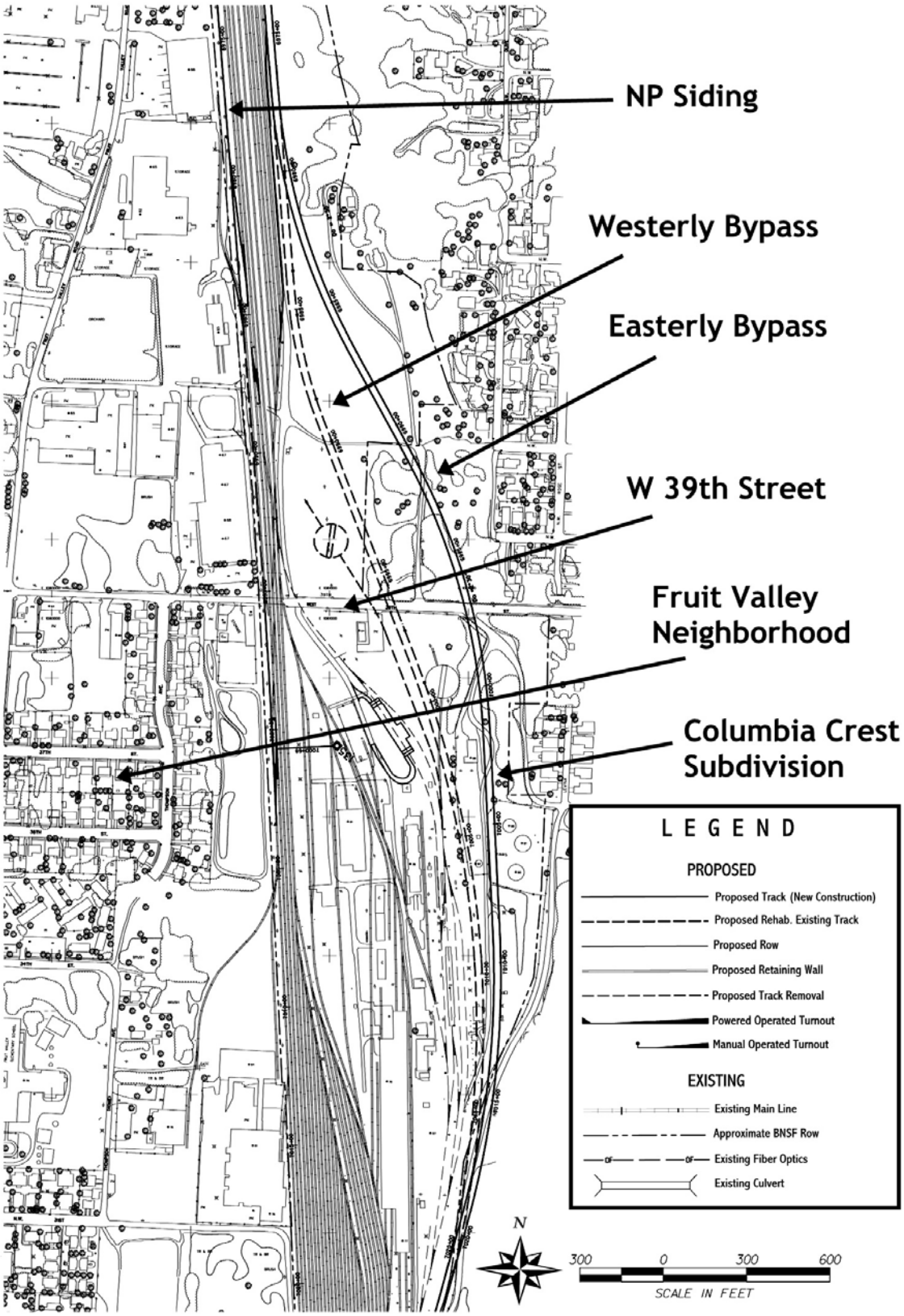
West 39th Street at-grade crossing (looking west)

At about rail milepost 133.5, on the eastern side of the rail line, the bypass tracks would begin. The two tracks would be designed with a minimum 25-foot track center. For the length of the double track bypass, the width of the two bypass tracks would be a minimum of 53-feet wide (without accounting for retaining walls, fills, and safety clearances). The new double track bypass would leave the main line and travel southeast to approximately West 39th Street. At this point it would be approximately 625 feet from the closest existing BNSF track.

Name Changes for the Environmental Documents

Exhibit 3-10

COMMUNITY RESOURCE TEAM NAME	DISCIPLINE REPORT/EIS NAME
Alternative A No Action	**Alternative A** No Action
Alternative B Bypass with Overpass at 39th	**Alternative B Option 1** Easterly Bypass Alignment with Vehicular Overpass
Alternative C Bypass and Close 39th	**Alternative B Option 2** Easterly Bypass Alignment with 39th Street Closure
Alternative D Bypass with Pedestrian/Bicycle Overpass	**Alternative B Option 3** Easterly Bypass Alignment with Pedestrian and Bicycle Overpass
Alternative I Move Bypass West Into Rail Yard and Close 39th Street and Improve Fourth Plain Boulevard	**Alternative I Option 2** Westerly Bypass Alignment with 39th Street Closure
Alternative J Move Bypass West Into Rail Yard with Overpass at 39th	**Alternative I Option 1** Westerly Bypass Alignment with Vehicular Overpass
Alternative requested at final Community Resource Team meeting on June 21, 2000.	**Alternative I Option 3** Westerly Bypass Alignment with Pedestrian and Bicycle Overpass



Easterly and Westerly Bypass Locations
Exhibit 3-11

Alternative B: Retaining Wall Locations

Exhibit 3-12

Plan Sheet Label*	Start Location	End Location	Length (in feet)	Maximum Height (in feet)	Track side	Cut/Fill
1	6886+67	6890+59	392	11	West	Fill
2	6889+01	6894+78	577	13	East	Fill
3	6894+99	6905+92	1093	16	West	Fill
4	6897+51	6900+52	301	17	East	Fill
5	6906+67	6916+38	971	11	West	Cut
6	6914+66	6918+94	428	14	East	Cut
7	6924+75	6933+24	849	10	East	Cut
8	6932+00	6954+21	2221	6	West	Cut
9	6943+17	6948+48	531	9	East	Cut
10	6956+51	6983+00	2649	6	West	Cut
11	6957+00	6960+66	355	11	East	Cut
12	6988+33	7008+04	1971	16	East	Cut
13	7033+77	7037+42	365	29	East	Cut

Plan sheets are located in **Appendix A.*

The bypass alignment would continue south along the western edge of the new Columbia Crest subdivision property line. As the bypass alignment turns west, towards the existing rail line, it would cross Columbia Crest's southern cul-de-sac. This alignment would require relocation of the cul-de-sac just east of its existing location.

The bypass alignment would move parallel to the existing tracks at approximately rail milepost 135.5. It would continue south, under Fourth Plain Boulevard and Mill Plain Boulevard, until about Jefferson Street, where it again would travel east to join the existing Vancouver-Spokane main line. The at-grade crossing at Jefferson Street, between 8th Street and Evergreen Boulevard would be eliminated to allow for more efficient and safer rail operations.

What are the options for the West 39th Street grade crossing?

Introduction of two new tracks crossing West 39th Street would increase the potential safety risks associated with this roadway. As such, three potential options have been developed for the treatment of the West 39th Street grade crossing. The following text discusses these optional treatments.

Option 1: Vehicular Overpass

The West 39th Street at-grade crossing would be reconstructed as a vehicular bridge over the rail tracks and yard. The overpass would provide continued access for trucks and automobiles. A bicycle lane and sidewalk, on each side of the roadway, would also be included.

The overpass would begin at-grade about 200-feet east of Northwest Cherry Street. Northwest Cherry Street would be relocated just east of this point in order to provide continued access to the homes along Cherry Street. The overpass would begin its descent on the western side of the yard just over Thompson Avenue. A frontage road would be built on each side of the overpass to allow for continued traffic into the existing businesses and homes just west of the yard. Construction of this overpass would require reconfiguration of residential driveways along Northwest Cherry Street. In addition, two homes on West 39th Street may need to be relocated.

The overpass would be built over the existing rail yard with a minimum of a 24-foot clearance. The bridge structure would be approximately 800-feet long. The facility would be built to meet ADA[7] requirements. **Exhibit 3-13** presents this vehicular overpass option. Conceptual engineering information is included, as appropriate.

Rail yard turntable and maintenance facilities

Option 2: Close the at-grade crossing

The West 39th Street at-grade crossing would be closed. Cul-de-sacs would be constructed just east and west of the rail line at West 39th Street. This closure would eliminate all vehicular, pedestrian, and bicycle crossings at this location.

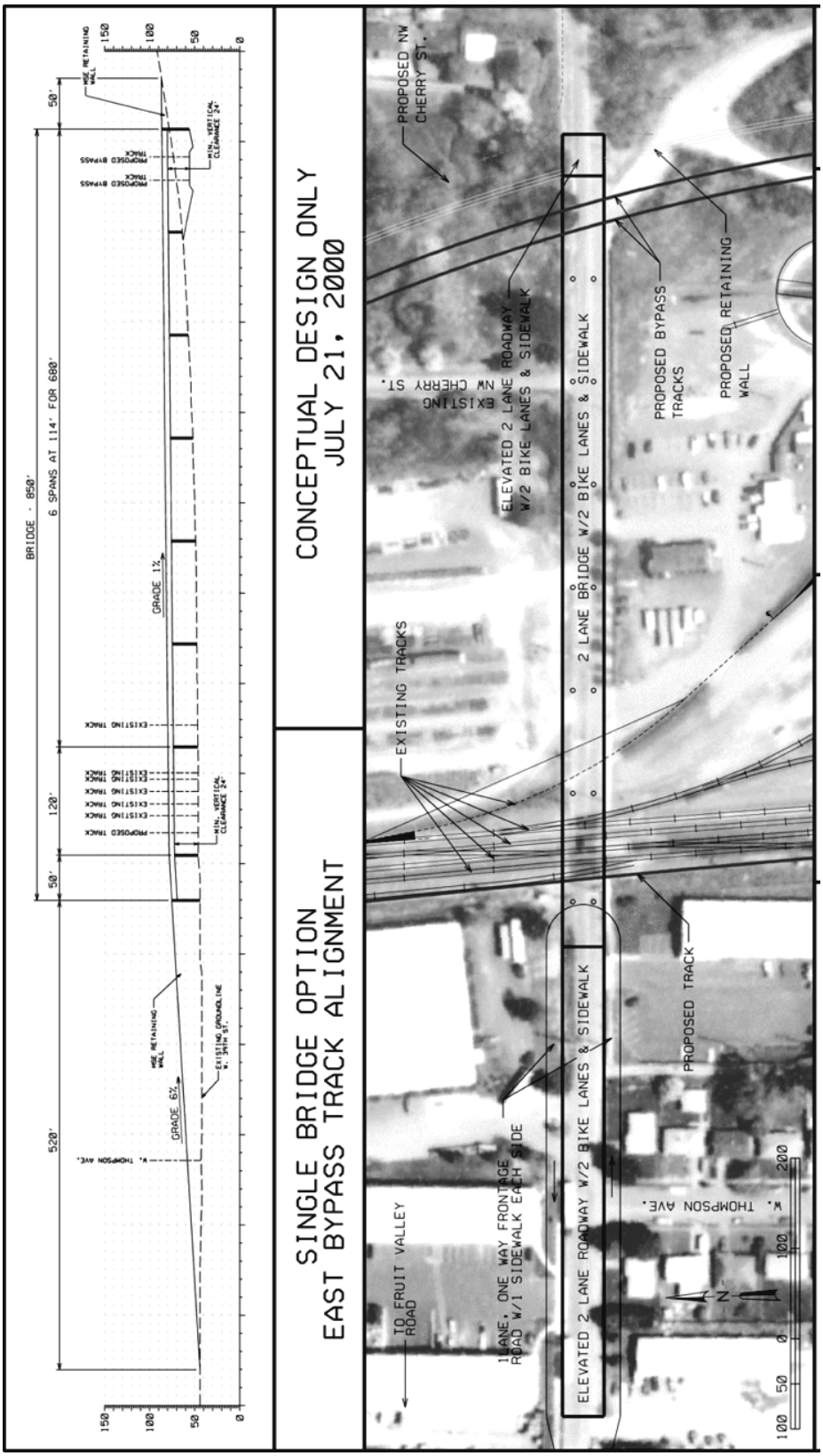
Option 3: Pedestrian/Bicycle Overpass

The West 39th Street at-grade crossing would be closed and a pedestrian/bicycle bridge would be built in this location. Vehicular traffic would be re-routed to surrounding arterials.

The overpass would begin at-grade about 200 feet east of Northwest Cherry Street. Cherry Street would be relocated just east of this point in order to provide continued access to the homes along Northwest Cherry Street. It is anticipated that West 39th Street, just west of the rail line, would be terminated with a cul-de-sac and overpass entrance.

Entrance to the overpass, on the eastern side of the rail yard, would be at-grade. Entrance on the west side of the rail yard would entail construction of a spiral ramp (or stairway) tower. The center of the western tower would provide additional room for a large elevator.

[7] *Americans with Disabilities Act*



Alternative B, Option 1: Easterly Bypass with Vehicular Overpass, West 39th Street Closed

Exhibit 3-13

The ramps and the elevator would meet all ADA requirements. The overpass would be built over the existing rail yard with a minimum of a 24-foot clearance. The bridge structure would be approximately 800-feet long. **Exhibit 3-14** presents this pedestrian overpass option. Conceptual engineering information is included, as appropriate.

View west towards Columbia Crest cul-de-sac and the Vancouver Rail Yard

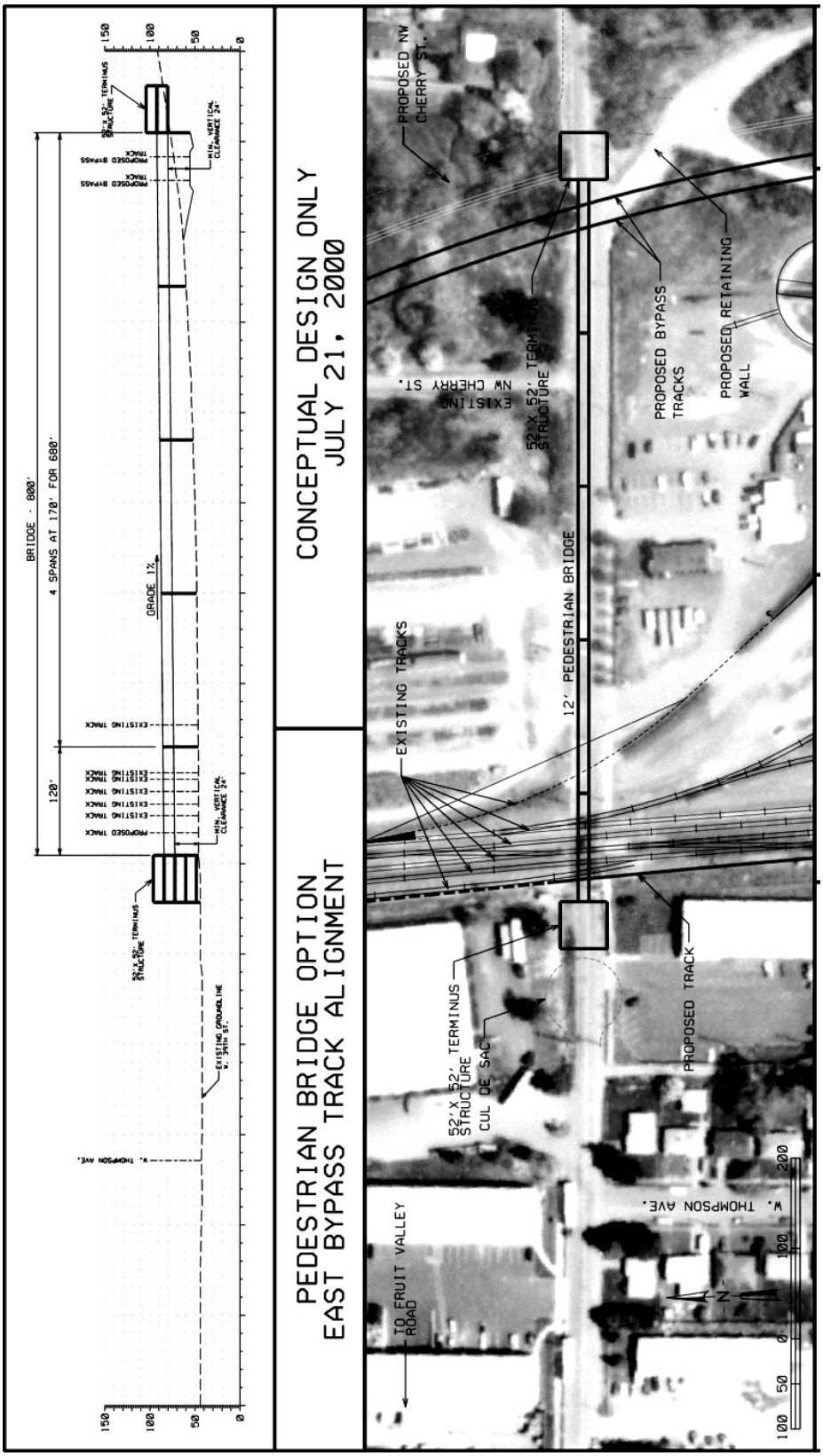
Alternative I: Westerly Bypass Alignment

This build alternative would consist of the construction of a double track rail yard bypass east of the existing BNSF tracks, but closer to the existing tracks than Alternative B. In addition, several yard tracks in the north end of the existing yard would be lengthened.

The alignment would begin at approximately milepost 132.5 near Burnt Bridge Creek. The current NP siding, located west of the double track main line would be restored in this area. Along the entire alignment -- to approximately rail milepost 135 -- the NP siding would either be rehabilitated or re-built. In addition, various turnouts would be constructed, while some existing turnouts would be removed. Retaining walls and fill would also be incorporated throughout this alignment. **Exhibit 3-15** presents a summary of retaining wall locations.

At about milepost 133.5, on the eastern side of the rail line, the bypass tracks would begin. The two tracks would be designed with a minimum 25-foot track center. For the length of the double track bypass, the width of the two bypass tracks would be a minimum of 53-feet wide (without accounting for retaining walls, fills, and safety clearances).

The new double track bypass would leave the main line and travel southeast to approximately West 39th Street. At this point it would be approximately 450 feet from the closest existing BNSF track. As the alignment continues southeast, the project would require the relocation of the BNSF rail yard turntable as well as some maintenance buildings. These facilities would be relocated elsewhere within the BNSF rail yard, or WSDOT will work with BNSF to identify appropriate parcels in the project area which would meet the needs of BNSF's displaced facilities. The bypass alignment would continue southeast towards the new Columbia Crest subdivision property line. As the bypass alignment turns west, towards the existing rail line, it would cross Columbia Crest's southern cul-de-sac.



Alternative B, Option 3: Easterly Bypass with Pedestrian/Bicycle Overpass, West 39th Street Closed

Exhibit 3-14

This cul-de-sac would need to be relocated just east of its existing location. The bypass alignment would travel parallel to the existing tracks at approximately milepost 135.5. It would continue south, under Fourth Plain Boulevard and Mill Plain Boulevard, until about Jefferson Street, where it would again move east to join the existing Vancouver-Spokane main line. Jefferson Street, between 8th Street and Evergreen Boulevard would be closed.

What are the options for the West 39th Street grade crossing?

Introduction of two new track crossings at West 39th Street would increase the potential safety risks associated with this roadway. As such, three potential options have been developed for the treatment of the West 39th Street grade crossing.

Option 1: Vehicular Overpass

The West 39th Street at-grade crossing would be reconstructed as a vehicular bridge over the rail tracks and yard. The overpass would provide continued access for trucks and automobiles. A bicycle lane and sidewalk, on each side of the roadway, would also be included.

The overpass would begin at-grade about 200-feet east of Northwest Cherry Street. Cherry Street would be relocated just east of this point in order to provide continued access to the homes along Cherry Street. The overpass would begin its descent on

Alternative I: Retaining Wall Locations

Exhibit 3-15

PLAN SHEET LABEL*	START LOCATION	END LOCATION	LENGTH (IN FEET)	MAXIMUM HEIGHT (IN FEET)	TRACK SIDE	CUT/FILL
1	6886+67	6890+59	392	11	West	Fill
2	6889+01	6894+78	577	13	East	Fill
3	6894+99	6905+92	1093	16	West	Fill
4	6897+51	6900+52	301	17	East	Fill
5	6906+67	6916+38	971	11	West	Cut
6	6914+66	6918+94	428	14	East	Cut
7	6924+75	6933+24	849	10	East	Cut
8	6932+00	6954+21	2221	6	West	Cut
9	6943+17	6948+48	531	9	East	Cut
10	6956+51	6983+00	2649	6	West	Cut
11	6957+00	6960+66	355	11	East	Cut
12**						
13	7033+77	7037+42	365	29	East	Cut

Plan sheets are located in **Appendix A*

***Wall required for Alternative B only*

the western side of the yard just over Thompson Avenue. A frontage road would be built on each side of the overpass to allow for continued traffic into the existing businesses and homes just west of the yard. Construction of this overpass would require reconfiguration of residential driveways along Northwest Cherry Street. In addition, two homes on West 39th Street may need to be relocated.

The overpass would be built over the existing rail yard with a minimum of 24-foot clearance. The bridge structure would be approximately 600-feet in length. The facility would be built to meet ADA requirements. **Exhibit 3-16** presents this vehicular overpass option. Conceptual engineering information is included, as appropriate.

Option 2: Close the at-grade crossing

The West 39th Street at-grade crossing would be closed. Cul-de-sacs would be constructed just east and west of the rail line at West 39th Street. This closure would eliminate all vehicular, pedestrian, and bicycle crossings at this location.

Option 3: Pedestrian/Bicycle Overpass

The West 39th Street at-grade crossing would be closed to vehicular traffic, and replaced with a bridge over the rail tracks and yard for pedestrian/bicycle use only. Vehicular traffic would be re-routed to surrounding arterials.

On the east side of the rail yard, the overpass would begin at-grade at the foot of Northwest Cherry Street. Cherry Street would be redesigned (with access further east on West 39th Street) in order to provide continued access to the homes along Northwest Cherry Street. It is anticipated that West 39th Street, just west of the rail line, would terminate with a cul-de-sac and overpass entrance. **Exhibit 3-17** presents this pedestrian overpass option. Conceptual engineering information is included, as appropriate.

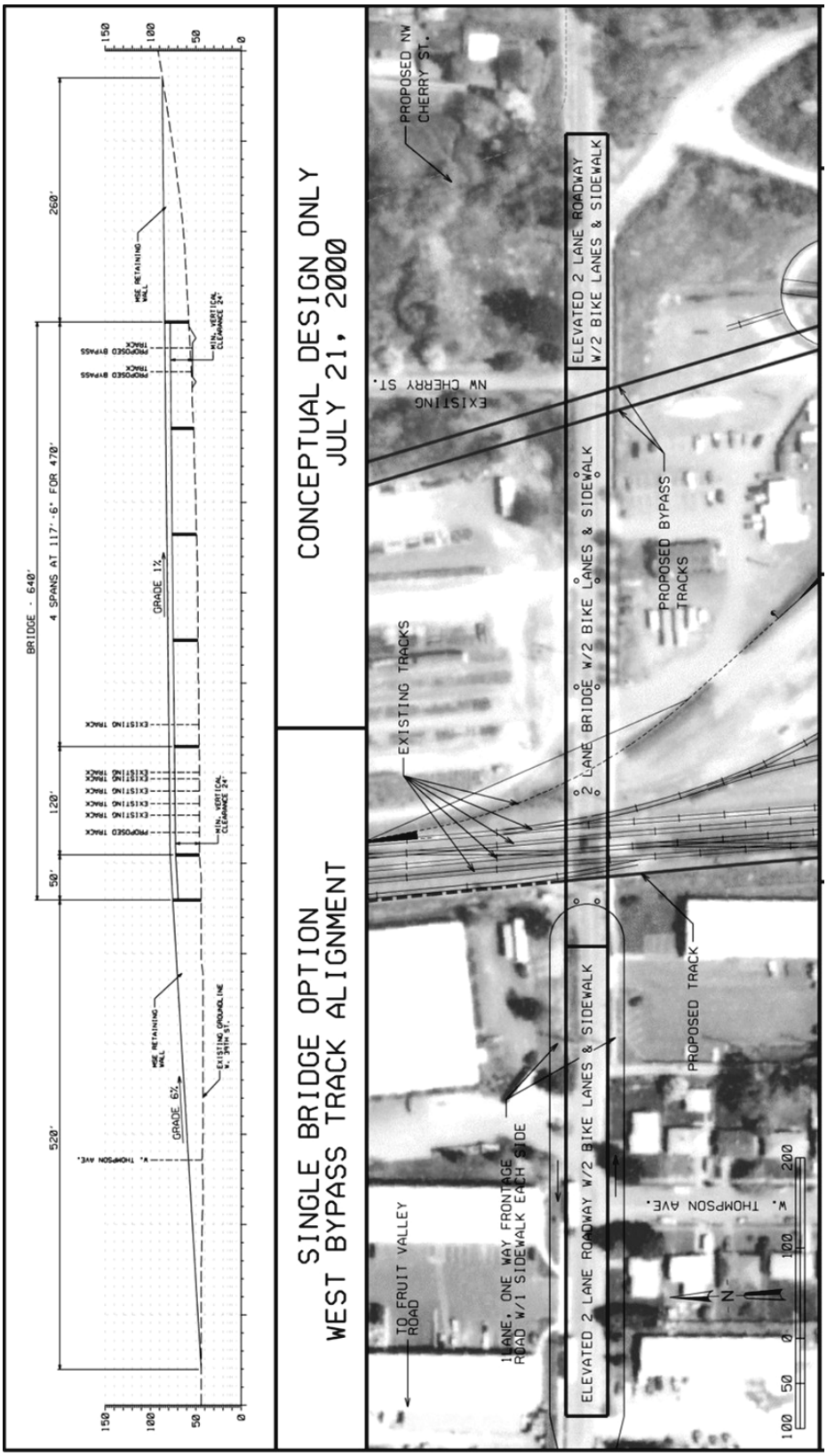
The profile of the vehicular overpass and the pedestrian overpass for both Alternative B and Alternative I are the same. **Exhibit 3-18** presents these conceptual profiles. Façade treatments for these structures would be consistent with community design features and traditional rail structure materials.

What materials are used for constructing rail lines?

Track structure has three elements: rails, ties and ballast. Rails are made of steel. Even though the steel is very hard, the rail wears out, just as highway pavement wears out. The ties, typically made of wood or concrete, support the rails. Ballast is crushed rock used to support the ties and keep the track in correct alignment. The condition of each of these elements dictates the weight and type of equipment that can be used on the rail line, as well as the speeds allowed on the track.

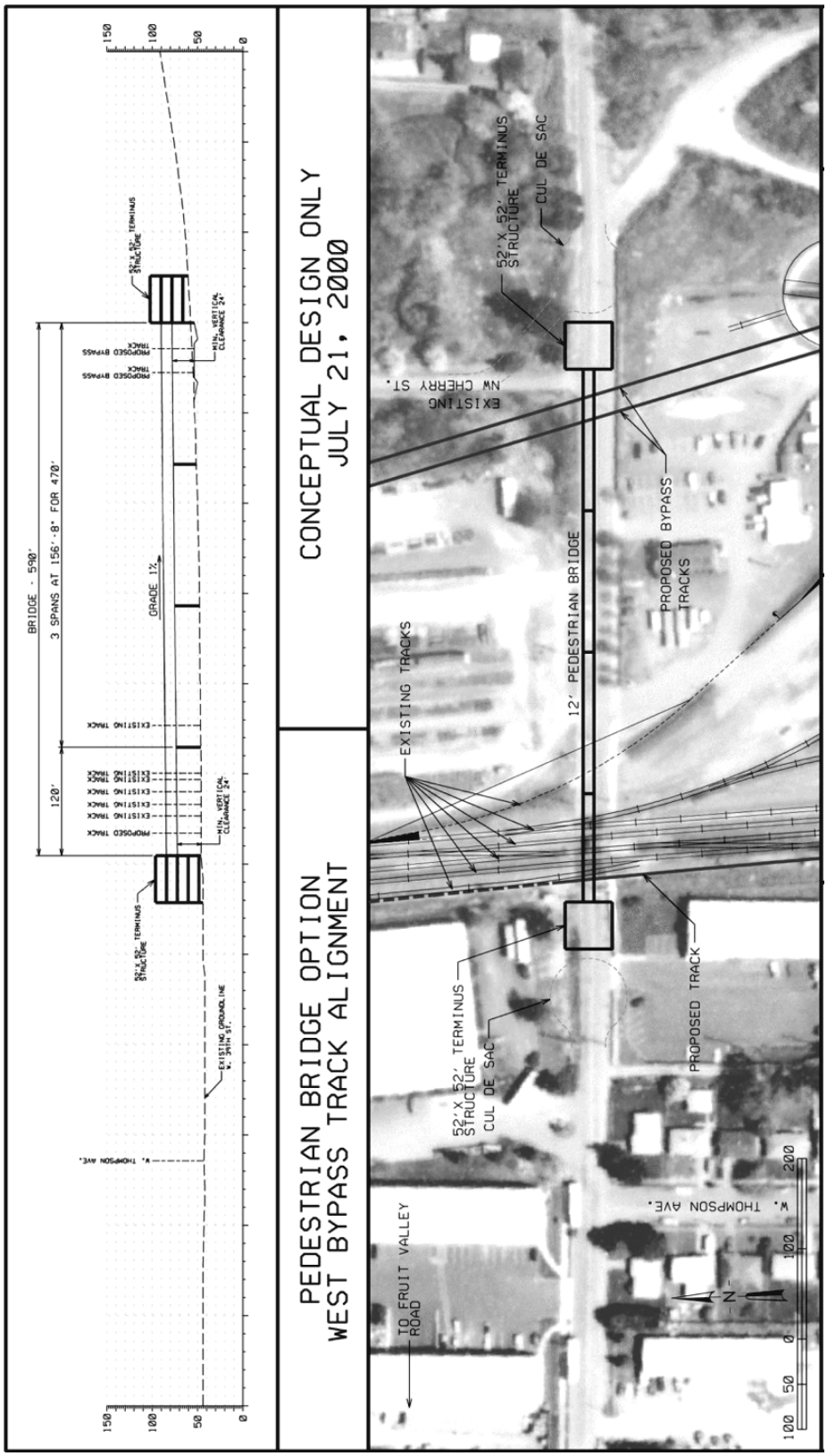
A typical track (that consists of rail, ties, and ballast) is constructed on a rail bed. Unlike highways (which are one hundred percent impervious), railroad tracks provide a surface that is conducive to water drainage.

Although the size and dimensions of railroad tracks are standard, construction of tracks are performed in a number of ways, depending on access to the site, environmental concerns, and geographic variables.



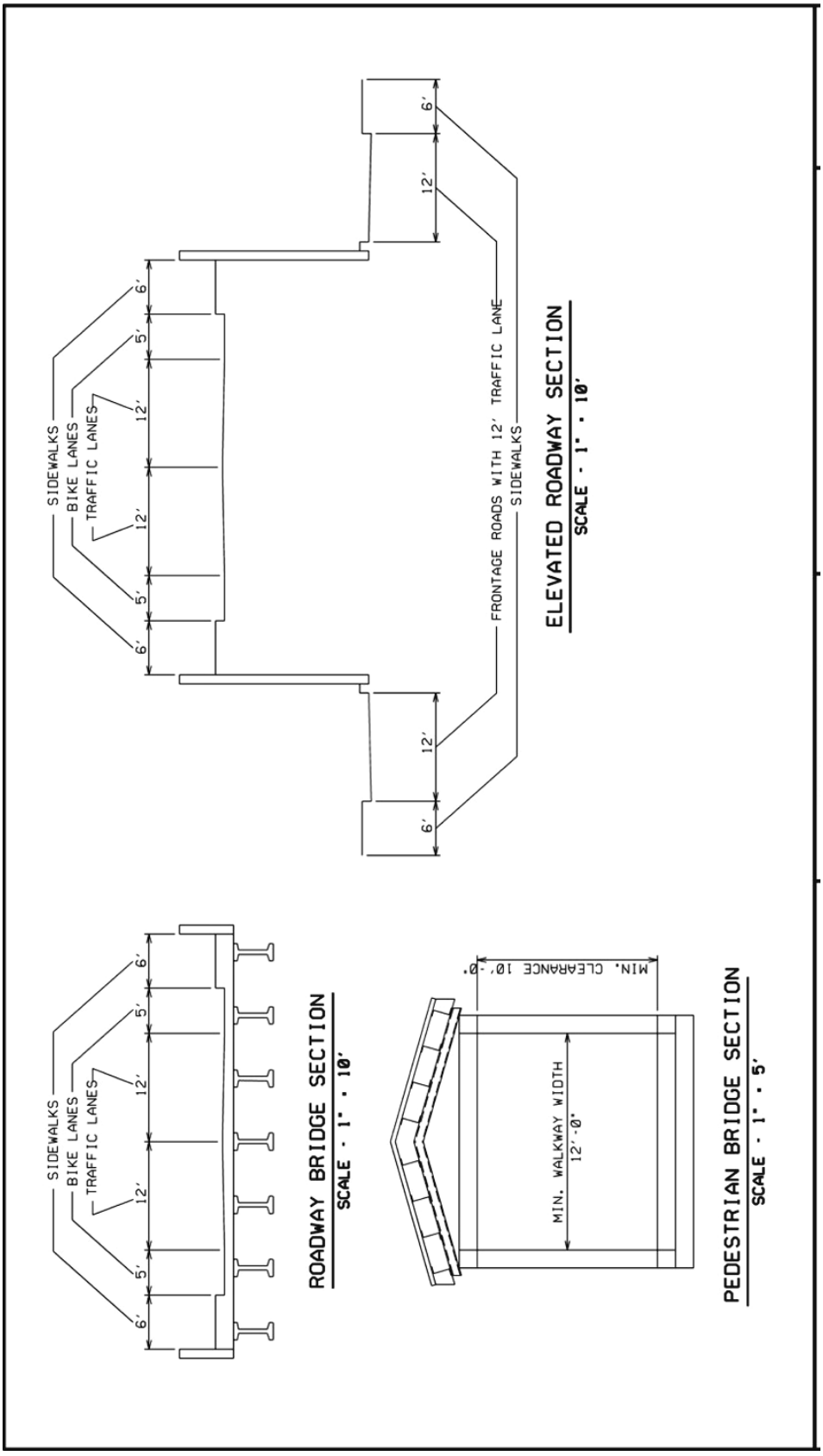
Alternative I, Option 1: Westerly Bypass with Vehicular Overpass, West 39th Street Closed

Exhibit 3-16



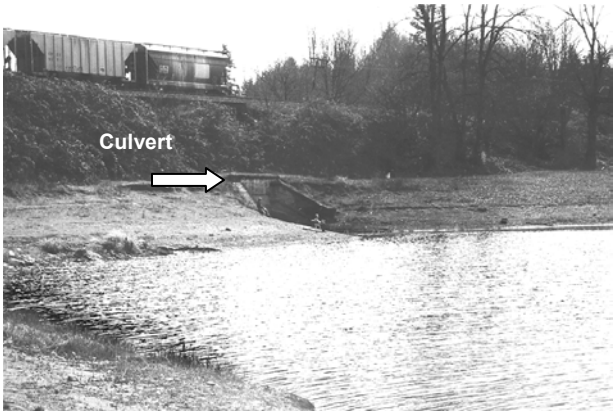
Alternative I, Option 3: Westerly Bypass with Pedestrian/Bicycle Overpass, West 39th Street Closed

Exhibit 3-17



Vehicular Overpass and Pedestrian Overpass Conceptual Profiles
Exhibit 3-18

How would construction of the two build alternatives be staged?



Burnt Bridge Creek culvert and Vancouver Lake

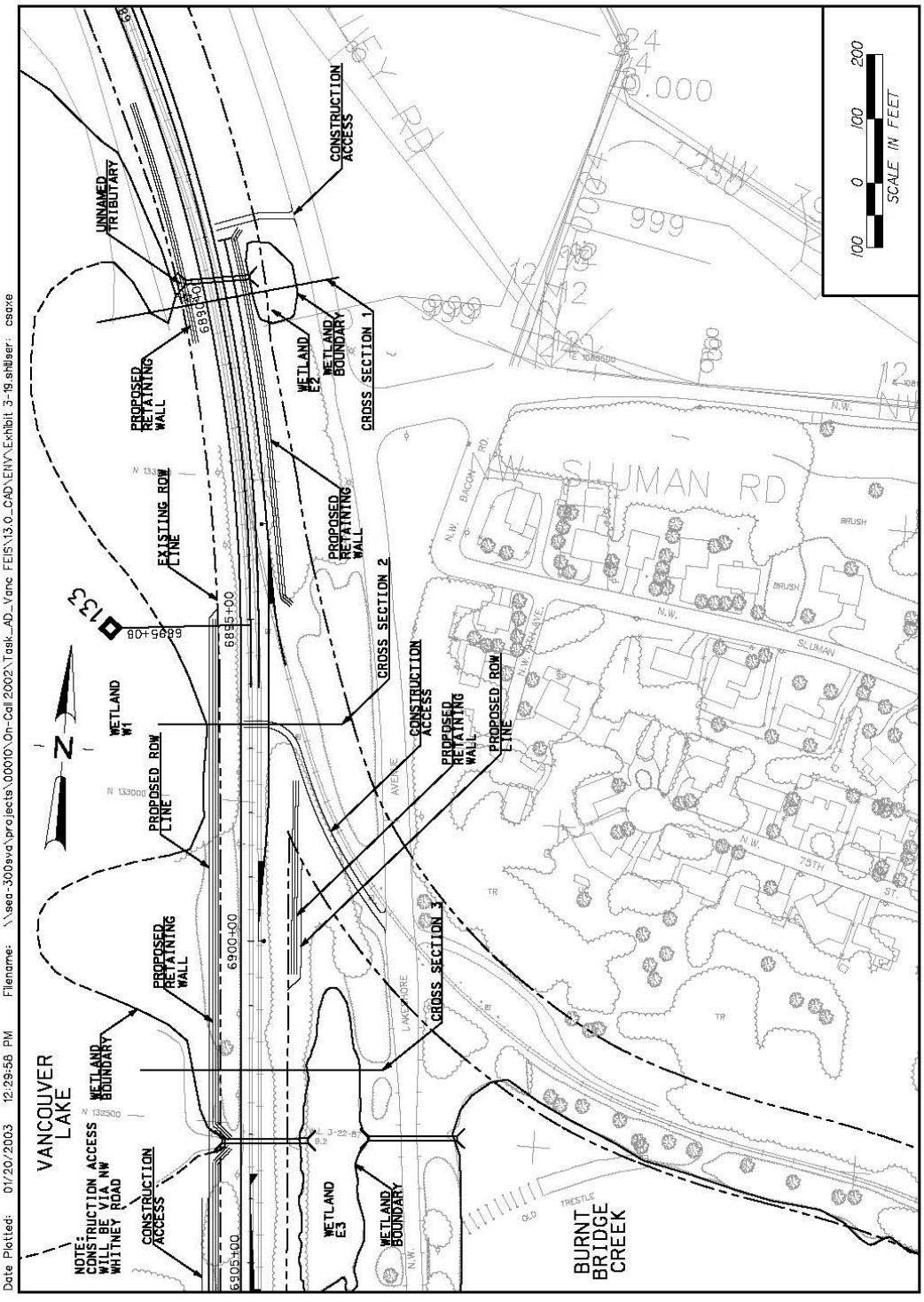
Recognizing the sensitive nature of fish habitats and critical areas adjacent to Burnt Bridge Creek and Vancouver Lake (at the northern terminus of the project area), a preliminary construction phasing plan was developed. This plan demonstrates that either of the proposed alternatives could be constructed in the vicinity of these sensitive areas without the need for permanent or temporary fills (which could potentially harm these habitats). This plan was developed to ensure that construction could take place without impacts; a detailed and refined construction phasing plan would be developed as part of the design and permitting process.

Construction access would be accomplished from multiple points. **Exhibit 3-19** shows the location of the proposed construction access and staging areas. Within each staging area, work would proceed from one end to the other, beginning with the construction of a temporary retaining wall.

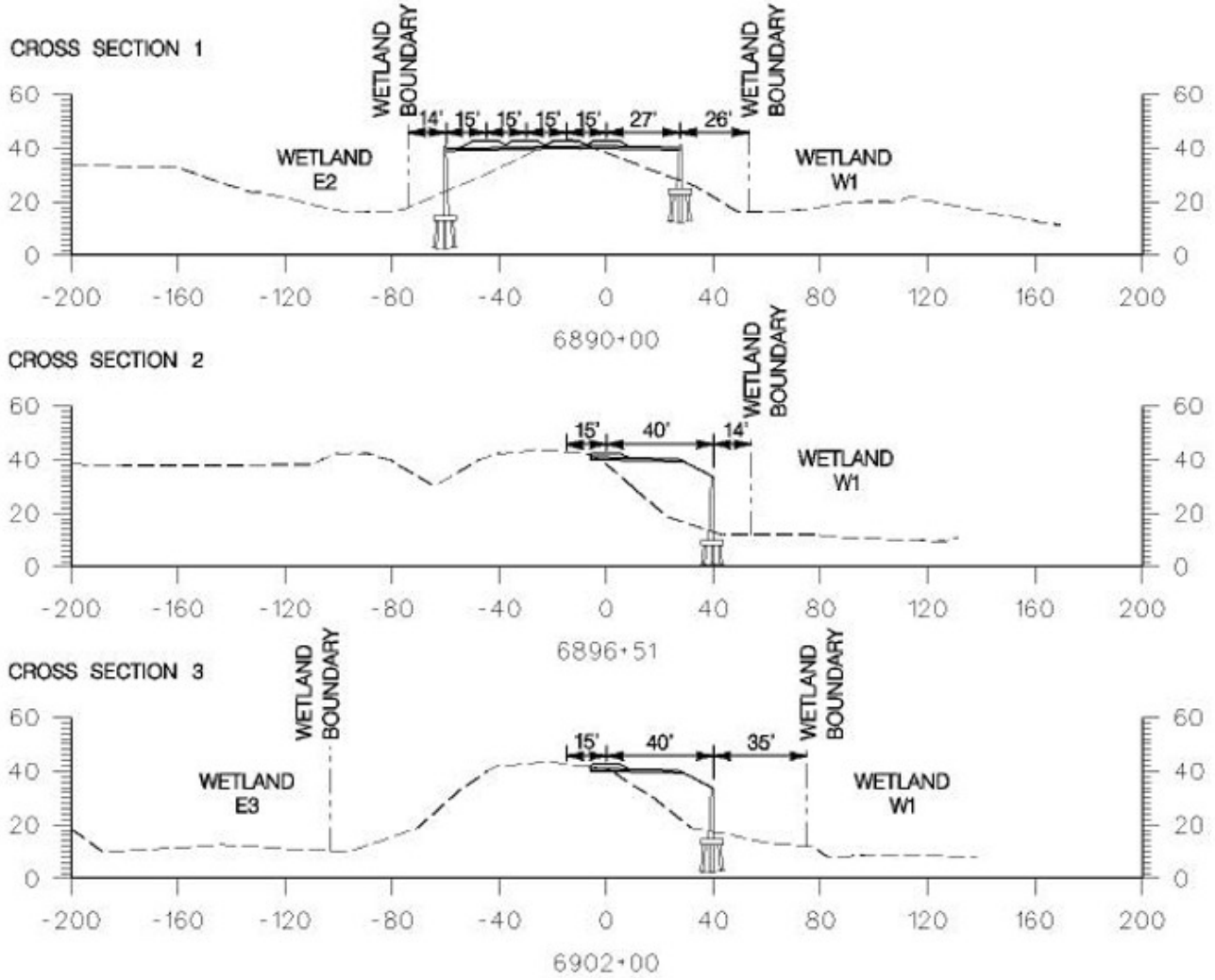
A retaining wall would be constructed at the base of the existing embankment in the vicinity of Burnt Bridge Creek. This wall is proposed as a means to prevent impacts to wetlands or waterways in this area. The wall would be approximately 2,000 feet long and would be installed west of the existing rail bed and 55 feet from the centerline of the existing westerly main line track. The wall would extend approximately 700 feet north and 1,300 feet south of the Burnt Bridge Creek culvert. No modification to the existing culvert would be required, and no in-water work would be required. Work would proceed from the north and south sides of the creek, so that equipment would not need to ford the stream. The retaining wall would be back-filled with material deposited on the trackside of the wall. Affected wetland buffer areas would be restored appropriately.

Clearing would be limited in the vicinity of the critical areas. No trees or significant vegetation would need to be removed. In these areas, machines would be required to complete construction of the retaining wall within a clearing zone no greater than the zone designated to contain the wall and its footings, and a ten-foot construction zone. No clearing would be permitted beyond this work area. Silt fences and other appropriate Best Management Practices (BMPs) would be developed through the completion of a temporary erosion and sediment control plan for the project. The cross sections in **Exhibit 3-20** provide surveyed limits of construction at three of the most critical points.

Construction Access Locations
Exhibit 3-19



Critical Locations: Cross Sections
Exhibit 3-20



What would happen if nothing were built?

Alternative A, the No Action Alternative, addresses this issue. This alternative would not make any changes to the existing rail infrastructure beyond those planned by The Burlington Northern and Santa Fe Railway Company (BNSF). Because BNSF is a private company, it is difficult to speculate what future infrastructure changes may be proposed for the Vancouver yard. It could be assumed, however, that general track and yard maintenance would continue for freight operations.

Based on BNSF projections, freight traffic is expected to grow by as much as five percent annually. Using this growth estimate, freight traffic would grow from 100 trains per day to 279 trains per day by the year 2020. This growth would happen regardless of whether the **Vancouver Rail Project** was implemented.

Assuming no new infrastructure or radical changes to the Vancouver yard area, it is likely that West 39th Street would remain open. The current seven-track crossing would remain in place, however, the number of freight trains crossing and blocking this roadway would increase by 179 percent in the next twenty years. Traffic and delay projections indicate that the West 39th Street at-grade crossing could potentially be closed (due to freight train delay) fifteen to twenty hours per day. Vehicular traffic is also expected to increase at West 39th Street by up to 83 percent.

As such, the No Action Alternative does not resolve the safety issues with the West 39th Street grade crossing and could potentially lead to an increased number of train-vehicle accidents.

Implementation of the No Action Alternative would also compromise the future of passenger rail service along the Pacific Northwest Rail Corridor. With no improvement in the Vancouver rail yard area, freight trains would continue to block the main line. By the year 2020, movement through the yard for passenger trains would virtually be impossible. Schedule reliability of passenger rail service would be severely compromised.

Exhibit 3-21 on the following page presents an overview of current and future conditions as they relate to the No Action Alternative. In addition, this alternative (baseline) is compared to the two build alternatives (and their options).

Exhibit 3-22 presents information regarding the overall transportation changes as they relate to the No Action Alternative and the two build alternatives.

What is the Preferred Alternative?

Working together with the Vancouver community and local agencies, the Washington State Department of Transportation has identified Alternative I, Option 1 (Westerly Bypass with Vehicular Overpass) as the preferred alternative. This alternative was chosen after the project team carefully reviewed the environmental and community impacts of all alternatives. Public comments were also incorporated into the decision-making process.

Comparison of Alternatives

Exhibit 3-21

	ALTERNATIVE A			ALTERNATIVES B (EASTERLY BYPASS) AND I (WESTERLY BYPASS)					
	No Action			Vehicular Overpass		Pedestrian Overpass		Closure of West 39th Street	
	1999	*2020*	*Change*	*2020*	*Change*[i]	*2020*	*Change*[ii]	*2020*	*Change*[iii]
RAIL SYSTEM									
Freight Trains (daily)[iv]	100	279	179	279	179	279	179	279	179
Amtrak Cascades Passenger Trains (each-way, daily)	6	6	0	6	0	6	0	6	0
ROAD SYSTEM									
West 39th Street PM Peak[v]									
Eastbound	117	214	97	343	129	0	-214	0	-214
Westbound	87	109	22	125	16	0	-109	0	-109
Fourth Plain Road PM Peak									
Eastbound	738	953	215	902	-51	1034	81	1034	81
Westbound	487	385	-102	374	-11	433	48	433	48
Average Daily Delay at West 39th Street (in hours)									
	8	15-20	7-12	0	0	NA	NA	NA	NA
Tracks crossing West 39th Street									
	7	7	0	9	2	9	2	9	2

[i] *Compared with the No Action alternative for year 2020.*

[ii] *Compared with the No Action alternative for year 2020.*

[iii] *Compared with the No Action alternative for year 2020.*

[iv] *Estimated. Based on 100 trains per day in 1999 with a 5% annual increase. Year 1999 data provided by WSDOT Rail Office.*

[v] *Traffic data are estimated based on turning movement traffic counts. Source: Revised Draft Report West 39th Street Rail Crossing Transportation Analysis, David Evans and Associates. April 14, 2000.*

Transportation Changes within the Community

Exhibit 3-22

SIGNALIZED LOCATION	SCENARIO 1: 2020 PM PEAK HOUR (NO CHANGE TO WEST 39TH STREET)		SCENARIO 2: 2020 PM PEAK HOUR (WEST 39TH STREET RAIL CROSSING CLOSURE)			SCENARIO 3: 2020 PM PEAK HOUR (WEST 39TH STREET RAIL OVERPASS)		
	Traffic Volumes (vehicles per hour)	*LOS**	*Traffic Volumes (vehicles per hour)*	*% Change compared to Scenario 1*	*LOS*	*Traffic Volumes (vehicles per hour)*	*% Change compared to Scenario 1*	*LOS*
78th Street at I-5 (1)	5021	C	5102	1.6%	C	4993	-0.6%	C
78th Street and Hazel Dell Avenue	3765	E	3858	2.5%	E	3729	-1.0%	D
78th Street at 9th Avenue	1710	B	1812	6.0%	A	1666	-2.6%	B
78th Street at Fruit Valley Road	1875	B	1955	4.3%	B	1846	-1.5%	B
39th Street at I-5 Northbound Ramp	2167	C	2159	-0.4%	C	2186	0.9%	C
39th Street at Main Street	3152	F	3010	-4.5%	E	3188	1.1%	F
Fourth Plain Boulevard at I-5 Northbound Ramps	3474	D	3483	0.3%	E	3443	-0.9%	D
Fourth Plain Boulevard at I-5 Southbound Ramps	2667	B	2689	0.8%	B	2670	0.1%	B
Fourth Plain Boulevard at Broadway Street	2543	D	2592	1.9%	D	2524	-0.7%	D
Fourth Plain Boulevard at Main Street	2686	D	2735	1.8%	D	2654	-1.2%	D
Fourth Plain Boulevard at Kauffman Avenue	1856	C	1979	6.6%	C	1802	-2.9%	C
Fourth Plain Boulevard at Fruit Valley Road	1756	D	1869	6.4%	D	1731	-1.4%	D
Mill Plain Boulevard at I-5 Northbound Ramps	3487	B	3544	1.6%	B	3509	0.6%	B
Mill Plain Boulevard at I-5 Southbound Ramps	4272	C	4310	0.9%	C	4270	-0.0%	C
Mill Plain Extension at Fourth Plain Boulevard (2)	2216	C	2169	-2.1%	C	2250	1.5%	C

Notes:

(1) The existing I-5 interchange with West 78th Street is currently under construction.

(2) The Mill Plain Extension and Fourth Plain Boulevard intersection was not evaluated for current conditions since construction of the extension was not complete at the time of this analysis.

**Level of Service*

Source: Revised Draft Report West 39th Street Rail Crossing Transportation Analysis, David Evans and Associates. April 14, 2000.